

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/23854

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A47L 13/20, 13/256, 13/24

US CL : 15/104.94, 227, 228, 231, 244.2, 144.1, 144.2, 144.4

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 15/104.94, 227, 228, 231, 244.2, 144.1, 144.2, 144.4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,048,123 A (HOLT et al) 11 April 2000 (11.04.2000), entire document.	1-5, 7-9, 12, 17-26, 28, 31-34, 37-48
Y	US 5,487,203 A (BRACH, JR. et al) 30 January 1996 (30.01.1996), entire document.	1, 22, 34, 37, 44
Y	US 3,703,739 A (YOUNG et al) 28 November 1972 (28.11.1972), figures 1-3.	6
Y	US 6,109,811 A (SONG) 29 August 2000 (29.08.2000), column 3, figure 2.	6, 27, 36
Y	US 2,764,744 A (BELSKY et al) 02 October 1956 (02.10.1956), column 2, figure 1 and 5.	6, 10, 29
Y	US 3,996,639 A (GRIFFIN et al) 14 December 1976 (14.12.1976), figure 1	11, 30
Y	US 5,010,617 A (NELSON) 30 April 1991 (30.04.1991), entire document.	13-16
Y,P	US 6,507,972 B2 (HART) 21 January 2003 (21.01.2003), column 3, lines 4-5.	35
Y	US 6,415,470 B1 (RAMRATTAN) 09 July 2002 (09.07.2002), entire document.	36



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

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document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

23 April 2004 (23.04.2004)

Date of mailing of the international search report

02 JUN 2004

Name and mailing address of the ISA/US

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